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RESEARCH NOTE

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EFFECTS OF DEFOLIATION BY THE GREAT BASIN TENT CATERPILLAR ON GREENLEAF MANZANITA AND MOUNTAIN WHITETHORN CEANOTHUS

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ABSTRACT: No appreciable brush mortality resulted from an insect outbreak of three years' duration which severely defoliated the species studied. One year after the outbreak ended most of the defoliated plants had started to recover.

In 1957 a severe infestation of the Great Basin tent caterpillar, Malacosoma fragile (Stretch), was detected in a large, well-developed brushfield located between Westwood and Chester, California. Feeding on leaves, the caterpillars defoliated several thousand acres of the brush cover, particularly greenleaf manzanita (Arctostaphylos patula Greene), which is not ordinarily a host, and mountain whitethorn ceanothus (Ceanothus cordulatus Kell.). Defoliation became so severe and widespread that some brush mortality seemed inevitable. In 1958, when the outbreak showed no signs of abating, we began a study on the destructive effects of the Great Basin tent caterpillar on these hosts.

The brush species affected are valued in some areas as browse plants for livestock and big game and for wildlife cover. They are also important plants in some picnic areas and campgrounds. In other areas, however, they hinder the successful regeneration of trees on sites where timber has been logged or burned off. Thus, it is important to know if the tent caterpillar has any potential use in reducing brush competition where timber grows, as well as to know whether brush species on game ranges or in recreational areas should be protected from infestations.

Study Area

The area chosen for study lies north of State Highway 36, halfway between Chester and Westwood. Originally heavily timbered, it was logged and burned over many years ago, with a resulting change in cover type from timber to brush. At the time of this study a few mature white fir and ponderosa pine trees were scattered through the area, but shrubs averaging about 3 feet in height almost completely covered the site. The species present, besides greenleaf manzanita and mountain whitethorn ceanothus, included snowbrush ceanothus (Ceanothus velutinus Dougl.), serviceberry (Amelanchier pallida Greene), and Sierra evergreen-chinkapin (Castanopsis sempervirens (Kell.) Dudley). The tent caterpillar fed upon all five species, but mostly on the first two.

Methods

We tagged 100 greenleaf manzanita and mountain whitethorn ceanothus bushes to observe the effects of tent caterpillar feeding on plant survival. The bushes were located in three different areas 1/2 to 1-1/2 miles apart, representing light, moderate, and heavy defoliation. The area with light defoliation had 34 tagged bushes; the moderate and heavy defoliation areas each had 33. In all three areas branches had begun to die on some plants by the time we started the study, but the individuals chosen for observation had no dead branches, even though they were severely defoliated and bore numerous tent caterpillar egg masses.

Upon revisiting the study area in 1959 and 1960, we examined tagged bushes for branch dieback, mortality, or recovery. The period of heavy infestation extended from 1957 to 1959 when natural factors began to help control the insect population. By 1960 the number of tent caterpillars was drastically reduced.

Results

Very little brush mortality was apparent in the areas of light and moderate defoliation when the study was started. In the heavy defoliation area, between 12 and 40 percent of the brush cover appeared dead. During the study period only one tagged plant died from the effects of tent caterpillar feeding, although the number under observation was reduced by half when a bulldozer destroyed 51 of the plants in 1959. The plant that died, a mountain whitethorn ceanothus, stood in the heavy defoliation area.

All tagged bushes that escaped accidental destruction in the light and moderate defoliation areas recovered fully by 1960; no mortality due to the tent caterpillar could be found in the remaining stands. The fate of the 20 tagged plants that escaped accidental death in the heavy defoliation area was:

	Mountain whitethorn ceanothus	Greenleaf manzanita
	- - - - - - (Number)	- - - - - -
Percentage of crown dead (1959):		
0-10	7	4
11-49	3	3
50-100	3	0
Condition (1960):		
Living	12	7
Dead	1	0

Left - The Great Basin tent caterpillar; and right - brushfield severely defoliated by tent caterpillar feeding.

Few other bushes in this area actually died from the effects of defoliation. Even the patches of apprently dead brush observed in 1958 and 1959 showed signs of recovering by sprouting root crowns in 1960.

More confidence might be placed in these results if the study had been started a year earlier and none of the shrubs under observation had been disturbed. But the results indicate that three successive years of heavy defoliation by the Great Basin tent caterpillar were not enough to cause appreciable mortality of greenleaf manzanita and mountain whitethorn ceanothus in the brushfield studied. Growth of these species, however, was slowed to some extent. The results also indicate that temporary damage to the brush can be severe enough to warrant controlling tent caterpillar infestations where the species affected are important for browse or recreational purposes. The possibility of using this insect to defoliate brush purposely, especially manzanita competing with young pines in plantations, needs further investigation.